Claims

1. Bioactive implant material for bone replacement having cartilage-forming and/or bone-forming activity composed of two components A and B, **wherein**
A is an osteoinductive protein or protein mixture or a DNA coding for one or several such proteins applied on B and B is a matrix material composed of calcium phosphate which has an intrinsic osteogenic activity.

2. Implant material as claimed in claim 1, wherein component A comprises one or several homodimeric or heterodimeric proteins of the TGF-ß superfamily with a cartilage-inducing and/or bone-inducing activity preferably of the GDF or BMP family or fragments thereof or DNA sequences coding therefor.

3. Implant material as claimed in claim 1 ~~or 2,~~ wherein component A
   (a) contains the mature part and optionally additional functional parts of the protein sequence shown in SEQ ID NO. 1,
   (b) contains parts of the mature part of (a) which have essentially the same activity, in particular mature proteins with a modified N-terminus,
   (c) contains parts corresponding to (a) or (b) which differ from SEQ ID NO:1 due to the origin of the protein from other vertebrates but have essentially the same activity,
   (d) in addition to containing parts of the mature

protein according to (a), (b) or (c), also contains parts of another protein from the TGF-ß superfamily in the form of a fusion protein,

(e) in addition to containing monomeric mature proteins according to (a) to (d), also contains a monomer of another protein from the TGF-ß superfamily with formation of heterodimers,

(f) in addition to containing dimeric mature proteins according to (a) to (e), also contains at least one dimer of another protein from the TGF-ß superfamily.

4. Implant material as claimed in ~~one of the claims 1 to 3,~~ claim 1 wherein B denotes a biodegradable or/and bioactive carrier matrix composed of tricalcium phosphate ceramics which is composed of crystallographically phase-pure α- or β-tricalcium phosphate ceramics with an interconnecting microporosity in the range of 20-60 % of its volume and alone already has bone-inducing properties.

5. Implant material as claimed in claim 4, wherein B denotes a biodegradable or/and bioactive carrier matrix composed of crystallographically phase-pure α- or β-tricalcium phosphate ceramics with a primary particle size in the range of 10-40 µm and in a suitable suspension for a medical application in suitable liquids such as water, serum, plasma and blood, causes no giant cell or connective tissue infiltration into the implant.

6. Implant material as claimed in ~~claims 4 or 5~~ claim 4, **wherein**
it is present in the form of an injectable suspension.

7. Implant material as claimed in ~~claims 4, 5 or 6~~ claim 4, wherein B denotes a biodegradable and bioactive carrier matrix composed of crystallographically phase-pure α- or β-tricalcium phosphate ceramics which releases A in a controlled retarded manner (controlled release) to the extent that B is subjected to chemical degradation in the bone store.

8. Process for the production of a bioactive implant material as claimed in ~~one of the claims 1 to 7~~ claim 1 in which the protein or the DNA sequence A is applied in the microporous structure of the biocompatible matrix B as a solution in a physiologically acceptable, water-miscible solvent or in appropriate solvent mixtures in such a way that a homogeneous distribution of A in and/or on the microporous structure of the matrix is achieved.

9. Process for the production of a compound as claimed in claim 8, wherein the solvent or solvent mixture is removed by sublimation preferably by freeze drying.

10. Process for the production of a compound as claimed in claim 8, wherein the protein or the DNA sequence A is concentrated by in situ precipitation in the matrix B from the solvent by admixing a precipitating solvent which is preferably water or ethanol.

11. Pharmaceutical composition containing an implant material as claimed in ~~one of the claims 1 to 7~~ claim 1 optionally together with pharmaceutically as well as physiologically acceptable auxiliary substances, diluents and/or fillers.

12. Use of a bioactive implant material as claimed in ~~one of the claims 1 to 7~~ claim 1 or of a pharmaceutical composition as claimed in claim 11 for the local treatment of diseases which affect cartilage and/or bones or/and of damage to cartilage and/or bone tissue caused by injury, operation, degeneration or strain.

13. Use of a bioactive implant material as claimed in ~~one of the claims 1 to 7 or of a pharmaceutical composition as claimed in claim 11~~ claim 1 for the treatment of bone defects such as periodontosis, sinus lift, cyst filling in the jaw region, bone fractures, bone replacement as well as for applications in cosmetic and plastic surgery and for immobilizing movable bone parts.

add c1 add 14 add h5 add h2